

RF-BM-S02 模块硬件规格书



信驰达科技有限公司

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● 概述

RF-BM-S02 蓝牙模块是基于 TI 公司 CC2540 芯片研发的低功耗蓝牙（BLE）射频模块，可广泛应用于短距离无线通信领域。具有功耗低、体积小、传输距离远、抗干扰能力强等特点。模块配备高性能蛇形天线；模块采用半孔形式硬件接口设计。

该模块可用于开发基于蓝牙 4.0（BLE，低功耗蓝牙）的消费类电子产品，手机外设产品等，能提高操作的可靠性；提高信号的传输距离和抗干扰性；还能实现解决不同电子产品间的互操作问题，电池寿命也可显著延长。为客户产品与智能移动设备通讯提供快速的 BLE 解决方案。软件开发可参考基于 TI 提供的标准 BLE 协议栈，LIB 底层库以及 API 调用接口。源码级 profile，APP Demo 等资料可有效缩短开发投入时间。

此模块的设计目的是迅速桥接电子产品和智能移动设备，可广泛应用于有此需求的各种电子设备，如仪器仪表，物流跟踪，健康医疗，智能家居，运动计量，汽车电子，休闲玩具等。用户可借此模块，以最短的开发周期整合现有方案或产品，以最快的速度占领市场，同时为企业的发展注入崭新的技术力量。

● 模块参数

以德州仪器设计为参考 TA = 25℃, VDD = 3 V and Fc = 2440MHz;

工作电压	2.0V ~ 3.6V
工作频段	2400 ~ 2483.5MHz
最大发射功率	+4dBm (-23dBm~+4dBm, 可编程)
接收灵敏度(低增益模式)	-87dBm
接收灵敏度(高增益模式)	-93dBm
频率误差	±20kHz
工作温度	-20℃ ~ +70℃ (芯片支持-40℃~+85℃, 可通过更换晶体调整工作温度)
储存温度	-40℃ ~ +85℃ (芯片支持-40℃~+125℃, 可通过更换晶体调整存储温度)
接收电流 RX	19.6mA
发射电流 TX (-6dBm)	24mA
功率模式 1 (4μs Wake-Up)	235μA
功率模式 2 (SleepTimerOn)	0.9μA
功率模式 3 (External Interrupts)	0.4μA

● 模块引脚及定义

如图 1 显示的是模块的引脚图，表 1 为其各引脚定义。

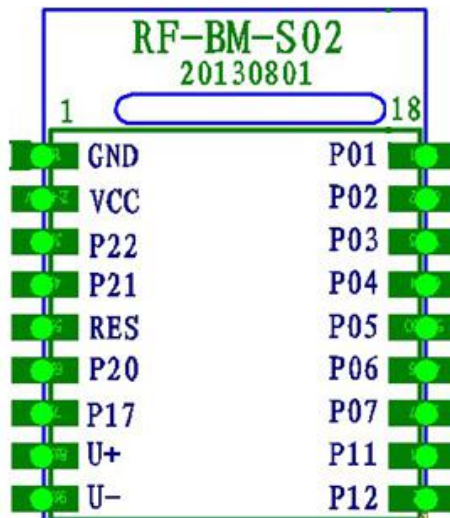


图 1 引脚定义

表 1 引脚定义

脚位	名称	功能	备注
Pin1	GND	模块地	模块地
Pin2	VCC	电源正极输入	模块电源，2V-3.6V
Pin3	P22	I/O	
Pin4	P21	I/O	
Pin5	RESET	复位脚	
Pin6	P20	I/O	
Pin7	P17	I/O	
Pin8	USB_P	USB+	CC2540 芯片支持 USB_P
Pin9	USB_N	USB-	CC2540 芯片支持 USB_N
Pin10	P12	I/O	
Pin11	P11	I/O	
Pin12	P07	I/O	
Pin13	P06	I/O	
Pin14	P05	I/O	
Pin15	P04	I/O	
Pin16	P03	I/O	
Pin17	P02	I/O	
Pin18	P01	I/O	

*注：此模块为追求小尺寸的精简版，部分 IO 没有引出。

● PCB 封装尺寸（四层板工艺）

模块为邮票半孔封装，如图 2 为模块尺寸，模块厚度为 $1.7\text{mm} \pm 0.2\text{mm}$ 。

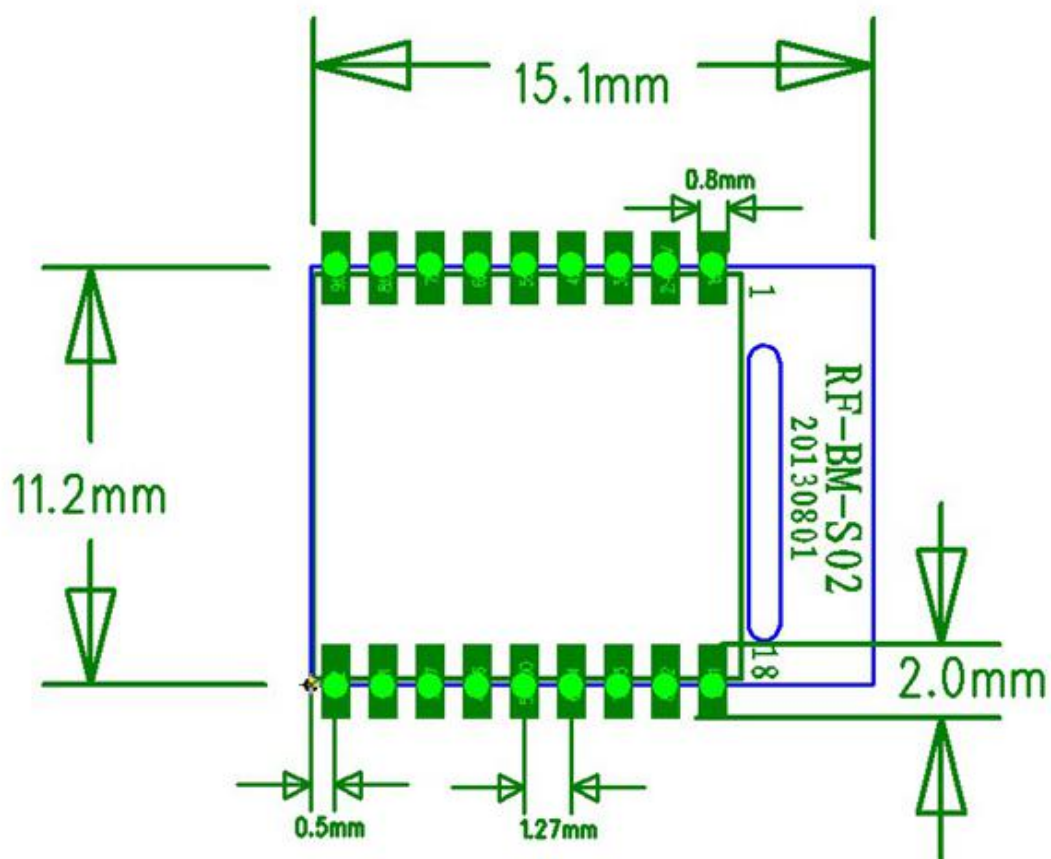


图 2 尺寸图

● 布局建议

PCB 上的倒 F 天线为自由空间电磁辐射。天线的位置和布局范围是增加数据速率和发射范围的关键。

因此，关于模块天线位置和路由的布局建议如下：

- 1、将模块天线放置在 PCB 板的边缘或角落上。
- 2、确保天线下面的每一层都没有信号线或者铜箔。
- 3、最好将图 3 中天线位置紫色方框处挖空，以保证其 S11 受影响很小。

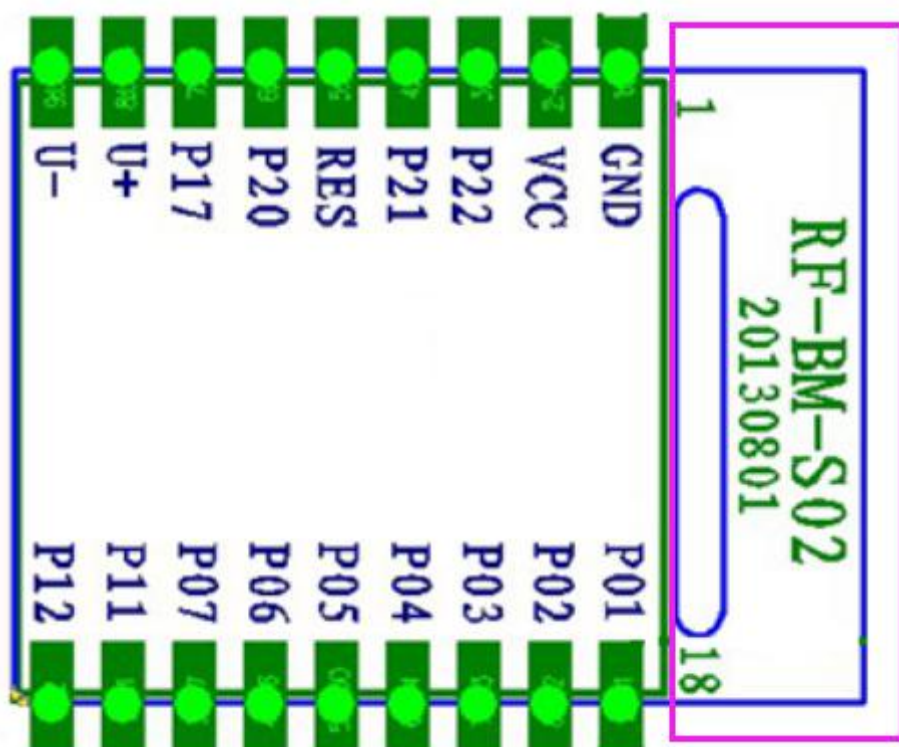


图 3

● 推荐操作条件

功能操作在以下表格中各条件参数值的极限之外不能保证其性能，长期在这个极限之外操作或多或少会影响模块的可靠性。

注意：

- 1、操作温度受晶体频率的变化限制；
- 2、为了确保无线射频性能，电源上纹波必须小于 $\pm 200\text{mV}$ 。

标识	条件	最小值	典型值	最大值	单位
电源与 IO	电池模式	1.8	3.3	3.8	V
操作温度	/	-40	25	85	℃
环境热摆		-20		20	℃/分钟

● 回流焊条件

- 1、加热方法：常规对流或 IR 对流；
- 2、允许回流焊次数：2 次，基于以下回流焊(条件)(见图 4)；
- 3、温度曲线：回流焊应按照下列温度曲线(见图 4)；
- 4、最高温度：245°C。

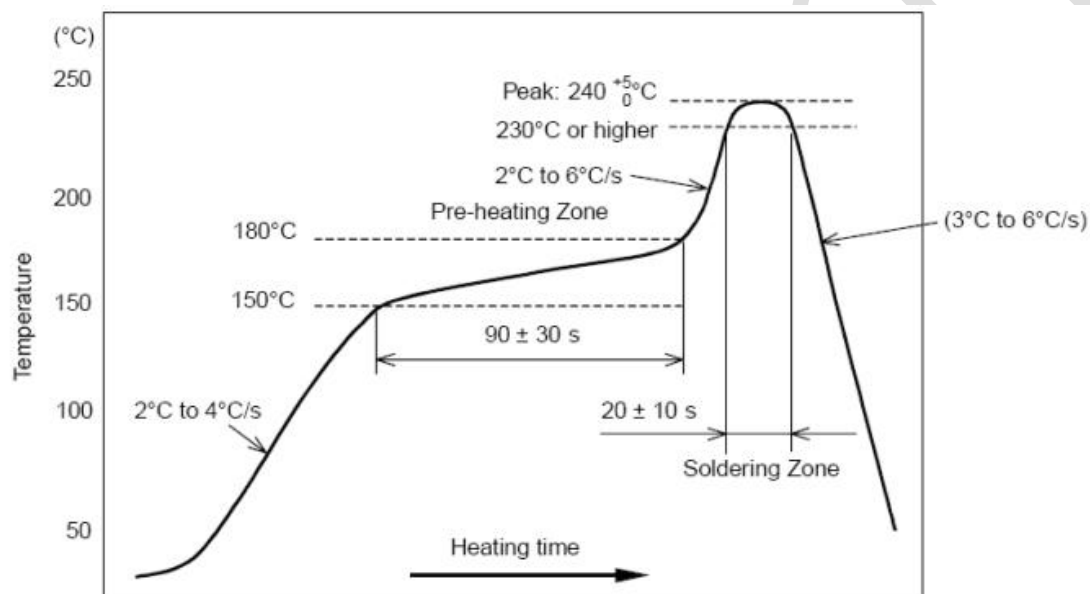


图 4 部件的焊接耐热性温度曲线(焊接点)

● 静电放电警示



模块会因静电释放而被损坏，RF-star 建议所有模块应在以下 3 个预防措施下处理：

- 1、必须遵循防静电措施，不可以裸手拿模块。
- 2、模块必须放置在能够预防静电的放置区。
- 3、在产品设计时应该考虑高电压输入或者高频输入处的防静电电路。

静电可能导致的结果为细微的性能下降到整个设备的故障。由于非常小的参数变化都可能导致设备不符合其认证要求的值限，从而模块会更容易受到损害。

● 版本更新记录

版本号	文档日期	更新内容
V1.0	2018/02/07	✓ 更新模块实物图 ✓ 更新模块工作与存储温度范围
V1.0	2018/02/26	✓ 更正模块工作与存储温度范围 ✓ 新增附录 C: CE 认证 ✓ 更新附录 D: RoHS 认证

● 联系我们

深圳市信驰达科技有限公司

SHENZHEN RF STAR TECHNOLOGY CO.,LTD.

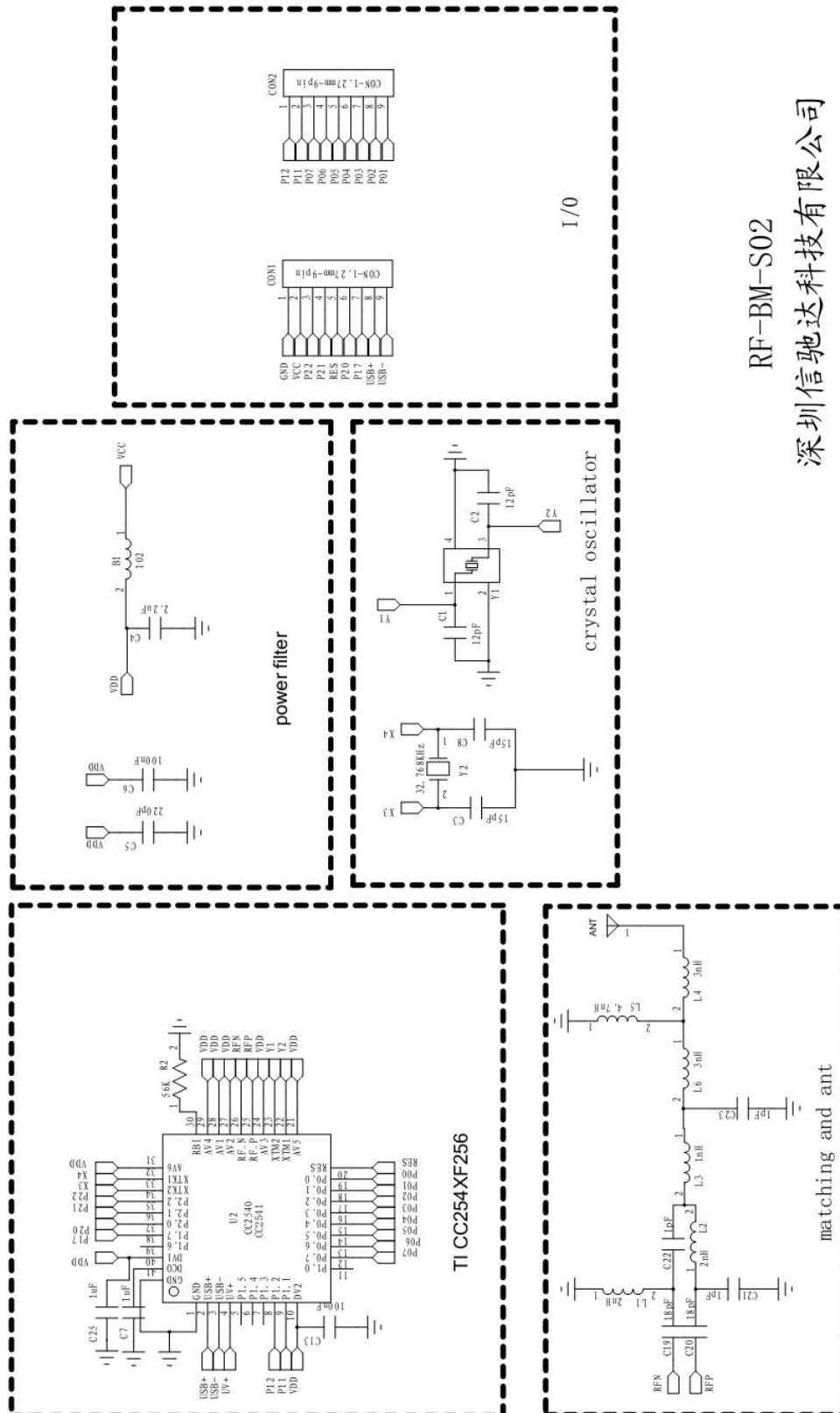
Tel: 0755-8632 9829 Web: www.szrfstar.com

Fax: 0755-86329413 E-mail: sales@szrfstar.com

地址: 深圳市宝安区宝源路互联网产业基地 A 区 8 栋 2 楼

Add: 2F,Block8,Dist.A,Internet Industry Base,Baoyuan Road ,Baoan Dist,Shenzhen

附录 A：模块原理图



RF-BM-S02
深圳信驰达科技有限公司

附录 B: FCC 认证

TCB
**GRANT OF EQUIPMENT
AUTHORIZATION**
TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

Nemko Canada Inc.
 303 River Road
 Ottawa, Ontario, K1V 1H2
 Canada

Date of Grant: 01/07/2016

Application Dated: 01/05/2016

ShenZhen RF-STAR Technology CO.,LTD
 2F,BLDG.8,Zone A,BaoAn Internet Industry Base,
 BaoYuan Road,XiXiang, BaoAn DIST,
 ShenZhen,
 China

Attention: Aroo woo

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is
 VALID ONLY for the equipment identified hereon for use under the Commission's
 Rules and Regulations listed below.

FCC IDENTIFIER: 2ABN2-RFBMS02A
Name of Grantee: ShenZhen RF-STAR Technology CO.,LTD
Equipment Class: Digital Transmission System
Notes: Bluetooth Module
Modular Type: Limited Single Modular

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHZ)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
	15C	2402.0 - 2480.0	0.000731		

Limited Single Modular Approval. Power output listed is conducted. Approval is limited to OEM installation only. Compliance of this device in all final host configurations is the responsibility of the Grantee. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other transmitter. OEM integrators must be provided with antenna installation instructions and labeling requirements for finished products. OEM integrators and End-users must be provided with transmitter operation conditions for satisfying RF exposure compliance. This grant is valid only when the device is sold to OEM integrators and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

附录 C: CE 认证

CCIS Shenzhen Zhongjian Nanfang Testing Co., Ltd.

VERIFICATION OF CONFORMITY

Verification No: CCISE170703301V
Applicant: SHENZHEN RF STAR TECHNOLOGY CO., LTD.
Address of Applicant: 2F, Block8, Dist.A, Internet Industry Base, Baoyuan Road, Baoan Dist, Shenzhen, China
Product Name: Bluetooth Module
Model No.: RF-BM-S02, RF-BM-S02A
Trade Mark: RF-star

Sufficient samples of the product have been tested and found to be in conformity with

Applicable standards: Draft ETSI EN 301 489-1 V2.2.0 (2017-03),
Draft ETSI EN 301 489-17 V3.2.0 (2017-03),
ETSI EN 300 328 V2.1.1 (2016-11),
EN 62479:2010,
EN 60950-1: 2006+ A11:2009 + A1:2010+ A12:2011+A2:2013

As shown in the CCISE170703301, CCISE170703302, CCISE170703303, CCISS170704001
Test report number(s):

Based on a review of the test report detailed above, this apparatus has met the requirements of the above standards and hence has been properly demonstrated that the requirement of the directive have been fulfilled. The product is in conformity with the article 3.1(a) the requirements of safety and article 3.1(b) the requirements of EMC and article 3.2 requirements of radio equipment in Directive 2014/53/EU.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The affixing of the CE marking presumes in addition that the conditions in all relative Directives are fulfilled.


Bruce Zhang
Laboratory Manager



02 Aug., 2017

Copyright of this verification is owned by Shenzhen Zhongjian Nanfang Testing Co., Ltd. and may not be reproduced other than in full and with the prior approval of the General Manager. This verification is subjected to the governance of the General Conditions of Services, printed overleaf.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China
Telephone: +86 (0) 755 2311 8282, Fax: +86 (0) 755 2311 6366, Website: www.ccis-cb.com

附录 D: RoHS 认证



TEST REPORT



REPORT No.: **DTI201801253515**

Date: 2018-01-30

Page 1 of 7

Applicant Company Name: SHENZHEN RF STAR TECHNOLOGY CO.,LTD.

Applicant Company Address: 2F, Block8, Dist.A, Internet Industry Base, Baoyuan Road, Baoan Dist, Shenzhen, China

Report on the submitted samples said to be:

Sample Name : Bluetooth Module
Model No. : RF-BM-S02A, RF-BM-S02
Sample Receiving Date : Jan.25, 2018
Testing Period : From Jan.25, 2018 to Jan.30, 2018
Results : Please refer to next page(s).

Summary of Test Results:

TEST REQUEST

CONCLUSION

A EU RoHS Directive 2011/65/EU and its amendment directives

Pass

Signed for and on behalf of
DTI

Approved by:

Li Ping



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Deesey Testing International Corp. (Shenzhen)
德泽威技术检测(深圳)有限公司

5/F, 1st Tower of Gaoxinqi High-tech Zone, 67th Zone, Liuxian 1st Road, Bao'an, Shenzhen, Guangdong, China
中国广东省深圳市宝安区留仙一路67区高新科技园新兴产业园二期1号楼5楼
Tel: +86-755-66683088 Fax: +86-755-66683099

附录 E： End Product Listing

EPL Bluetooth® End Product Listing

The Bluetooth SIG Hereby Recognizes

ShenZhen RF STAR Technology CO.,LTD.

Member Company

RF-BM-S01_v1.1

Qualified Design Name

Qualified Design ID(s): **B016552**

Contact Person: **Aroo Wong**

Series: **V1.1**

Publish Date: **13 November 2013**

EPL Type: **Other**

This certificate acknowledges the *Bluetooth*® Specifications declared by the member were achieved in accordance with the *Bluetooth* Qualification Process as specified within the *Bluetooth* Specifications and as required within the current PRD



附录 F: REACH 认证

Verification of Conformity

Applicant Name: SHENZHEN RFSTAR TECHNOLOGY CO.,LTD
Address: 2F,BLOCK8,DIST.A,INTERNET INDUSTRY BASE,BAOYUAN ROAD ,BAOAN DIST.,SHENZHEN,CHINA

hereby declares that the product

Product Tested: BLE BLUETOOTH MODULE ZIGBEE MODULE WIFI MODULE

Model Number: RF-BM-S01;RF-BM-S02;RF-BM-S02A;RF-BM-S03;RF-BM-S02D; RF-BM-S03S;
 RF-BM-S02I;RF-BM-26405X5B1;RF-WM-3200B1;RF-WM-7681B1;RF-WM-7681
 B2;RF-DG-2540B1;RF-ZM-2530B1;RF-ZMPA-2530B1;RF-BMPA-2540B1;RF-BM
 -51822B1

Ratings and principal characteristics: The mixed test result is PASS,Conform to the requirements of the regulations

Conforms to the following specifications

Relevant Standards/ Specifications/ Directives Article 33 of Regulation (EC) No 1907/2006 requires supplier of an article containing a substance meeting the criteria in Article 57 and identified in accordance with Article 59(1) in a concentration above 0.1% weight (w/w) shall provide the recipient of the article with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance.

Verification Issuing Office Name & Address Euronos Consumer Products Testing Service Co.,Ltd
 3F,Huafeng Building,No.77, Hetian Avenue Houjie Town, Dongguan City, Guangdong Province,China
Date of tests Sep 22, 2015
Report no. C150918025001



Signature: Will Pan

Name: Will Pan
 Position: CPST
 Date: 2015-9-22